

Engineering Tripos Part IIA Project, GD4: Civil Engineering Design Project, 2023-24

Leader

[Dr S Stanier](#) [1]

Timing and Structure

Tuesdays 11-1pm, and Fridays 9-11am plus afternoons

Prerequisites

3D1

Aims

The aims of the course are to:

- To understand the major components and working principles of a quay;
- To understand astronomical tides and storm surges;
- To deduce strength parameters of soils from test data;
- To design retaining walls in complex situations using hand calculations and the finite element method;
- To specify a capping beam, fenders and bollards;
- To decide the construction procedure and calculate the project cost;
- To appreciate the multi-disciplinary nature and the environmental impact of an engineering project.

Content

The project involves the design of an anchored sheet pile wall on one side of an estuary to create berthing for ships and retain a section of river bank for storage and traffic. It aims to show how structural, geotechnical and hydraulic concepts can be applied in the design of facilities.

FORMAT

Students normally work in groups of four, but are responsible for and author specific parts of the reports. Groups can capitalise on a broader range of ideas for the overall conceptual designs, and can deal more comprehensively with the detailed design.

Week 1

Site characterisation – tide and storm surge, ships, quay dimensions, soil properties.

Week 2

Conceptual design – selection of the quay location, possible structural forms of the quay wall and ancillary components, construction procedures, other things that need to be considered. (Interim report is due.)

Week 3

Design a sheet pile wall remaining in equilibrium under earth pressure, water pressure and surcharge exerted by cargo, vehicles and cranes.

Week 4

Complete the detailed design of the quay wall, and decide an overall configuration of the quay together with scour prevention measures and berthing and fendering facilities. (Final report is due.)

Coursework

Coursework	Due date	Marks
Interim Report	TBA	30 (15 for individual and 15 for group work)
Final report	4pm, Friday 9 June 2023	50 (35 for individual and 15 for group work)

Examination Guidelines

Please refer to [Form & conduct of the examinations](#) [2].

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Links

[1] <mailto:sas229@cam.ac.uk>

[2] <https://teaching.eng.cam.ac.uk/content/form-conduct-examinations>